

Notes on Australian Syrphinae (Diptera)

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The majority of the Syrphidae that are of economic importance, come within the subfamily Syrphinae which was not incorporated in the revision of the family given by the late E. W. Ferguson. There is, however, an incomplete manuscript in the hands of Dr. I. M. Mackerras which I have not seen and there, will be found the descriptions of a number of manuscript names applied to specimens in various collections. A study of the material named, leads me to the conclusion that Ferguson intended to revise the genus on the plan found in Brunetti's paper; inserting the Australian genera that are foreign to the Indian element. I cannot see how he intended to treat *Emmyia*, *Chilosia* and *Hemilampria*, for he evidently did not recognise and name these; nor can I see any improvement contemplated in regard to the treatment of species that had been placed under *Melanostoma*; nevertheless, I credit to the effort of Ferguson, the identity of most species whether they be obvious or not. Some of the names were applied before Ferguson began his revision.

I am indebted for the loan of some exotic genera to Dr. W. Horn, Director of the "Deutscher Entomologisches Institut," these genera being somewhat akin to the *Psilota* element. It would seem that Brunetti, Ferguson, Klocker and myself, were all a little confused in regard to the limits of *Psilota*, but the study of the typical form and other genera has now allowed me to suggest an improvement in its treatment, making two subgenera, of which one could be raised to generic rank if desired. As at present constituted, the genus *Psilota* forms the largest unit represented in Australia, for there are many undescribed species.

Besides my own, other collections which I have seen when compiling these notes, are those of the Queensland and Australian Museums, the Ferguson collection in the School of Tropical Medicine, Sydney, and that of Mr. F. A. Perkins. All of these contain specimens identified under manuscript names and doubtless will be found as species described in the Ferguson manuscripts.

KEY TO THE GENERA OF SYRPHINAE.

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| 1. Face with a central knob in both sexes | 2 |
| Face with a central knob on male only | 11 |
| Face without a central knob in either sex | 9 |
| 2. Seen in profile, face with a conspicuous concave line between the antennae and tubercle, or if only slightly concave, then a bright yellow and black species | 3 |
| Face hardly concave between the antennae and tubercle. Dark species, at most with yellow on only part of the face and scutellum | |
| 3. Abdomen very long and slender, usually clubformed, and the second segment reaching to about one third of the abdomen | <i>Paragus</i> |
| Abdomen not so formed, and if slender the second segment reaching not beyond one quarter of the length of the abdomen | <i>Baccha</i> |
| 4. Face and scutellum black | 4 |
| Face or scutellum at least partly yellow | <i>Melanostoma</i> |
| | 5 |

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| 5. Thorax with conspicuous yellow lateral margins on the dorsum, and also the pleura with yellow parts | 6 |
| Thorax without, or at least with inconspicuous yellow lateral margins and the pleurae never with yellow parts | 8 |
| 6. Hind trochanter with a conspicuous spine-like process, a character that is unique to the genus | <i>Ischiodon</i> |
| Hind trochanters simple | 7 |
| 7. Abdomen rounded at the lateral border and without a depression marking it off | <i>Sphaerophoria</i> |
| Abdomen very flattened, the sides having an edge marked off by a depression | <i>Xanthogramma</i> |
| 8. Ocellar triangle placed well back on the head so that it is no further than its own length, away from a line joining the posterior border of the two eyes | <i>Syrphus</i> |
| Ocellar triangle placed well forward so that it is further away by twice its own length, from a line joining the posterior border of the two eyes | <i>Asarkina</i> |
| 9. Abdomen with the third and second segments longer than wide, and other segments inconspicuous by comparison. The enlargement of this region is unique to the genus | <i>Triglyphus</i> |
| Abdomen with the second, third and fourth segments subequal in size | 10 |
| 10. Head produced so that seen in profile, the antennae are as far away from the eye as the width of the eye; thence the face is very concave to the oral margin which again reaches as far from the eye | <i>Cyphipelta</i> |
| Head normal. Typically with the face long and straight and the mouth border more or less produced forwardly; the face, however, may be short with a much enlarged prominence at the mouth border, making the face concave apparently for its whole length. All grades are found in these face characters | <i>Psilota</i> |
| 11. Median vein meeting the fifth radial at an acute angle, and running parallel with the wing margin. (Besides the form placed here, the male of which has hairy eyes, <i>Plesia analis</i> Macq. runs here, too, but it can hardly be congeneric) | <i>Chilosia</i> |
| Median vein running into the fifth radial at right angles and remote from the wing border | <i>Hemilampra and Chrysogaster</i> |

The following notes on the species gives the original generic name applied by the author to the species, but are arranged under the generic name in which they are now placed.

Genus *Paragus* Latrielle.

Mulio serratus Fabricius 1805, is a widely distributed form recorded from New Guinea, but not hitherto from Australia. It is rather plentiful in northern Queensland and two females are from Palm Island, May 1925, these bearing Ferguson's identification label. It is readily recognised by the apical half of the abdomen being yellow with serrations along its border.

Pipiza tibialis Fall. 1817, is a species of the northern hemisphere, but Ferguson identified one in the Queensland Museum (Brisbane, 3.ii.1914, H. Hacker) under a synonym, *P. rufiventris* Brunetti. This form has the third and subsequent abdominal segments red. Except for the face and legs which are partly yellow, there is an entirely black specimen in my collection from Brisbane, April 1928. The species is evidently introduced.

Genus *Melanostoma* Schiner.

Syrphus agrolas Walker 1849, *S. expositus* Walker 1852, and possibly *S. propinquus* Macquart 1849, all described from Tasmania, are names belonging to the species to which Ferguson attached Walker's first specific name. It is very abundant in Tasmania and

the four large spots of the abdomen, together with the black face and scutellum, makes the species readily determined. There is a close ally with an entirely black abdomen, in the Queensland Museum.

Syrphus univittatum Wiedemann 1824, is the name applied to a species formerly known as *Syrphus planifacies* Macquart 1848, in Australia. It is the small species abundant in swamps during spring and is represented in most collections. The tubercle of the face is sometimes difficult to make out and at other times appears like an obscure pair of adjacent tubercles.

Klocker's determination of *Melanostoma apicale* Bigot, does not belong here, but is referred below under *Plesia analis* Macquart, which may belong to a new genus.

Genus *Ischiodon* Sack.

Scaeva scutellare Fabricius 1805, has many synonyms and it may have been described from Australia under a name not yet recognised. It is not uncommon in northern Queensland where it has been bred by Mr. W. A. McDougal who found it infesting sugar cane aphides, it also occurs in Brisbane. Under the name *Xanthogramma scutellaris*, Ferguson has labelled specimens that may be this species, but they miss the spine on the trochanters, whilst another specimen is queried as belonging to this genus and is given the same specific name. It requires Ferguson's manuscripts to disentangle this matter, for he does not seem to be consistent in applying the name.

Genus *Sphaerophoria* St. Farg. & Serv.

Syrphus javana Wiedemann 1824, is a species with a wide range and reaches Australia; *Melithreptus australensis* Schiner 1868, is a synonym and there may be others not recognised as belonging here.

Sphaerophoria kerteszi Klocker 1924, has more recently been described, but Ferguson has labelled it as being *S. menthastri* Linnaeus 1758, the typical form of the genus. The specimens I have seen do not agree with the description of the latter, which however, is said to be very variable.

Genus *Xanthogramma* Schiner.

Syrphus grandicorne Macquart 1842, described from Port Jackson, is perhaps the most abundant fly of the family in Australia, occurs abundantly in all States and has been reared from aphides in most of them. It is also considered to be capable of feeding on scale insects but I have seen none reared in this manner. It is the most dominant species, and its wide range suggests it could be introduced into most parts of the world.

In the manuscripts of Arthur White, it was suggested that *Syrphus pusilla* Macquart 1847, is a synonym. *Syrphus sydneyensis* Macquart 1846, *S. pallidus* Bigot 1884, and *S. macrogaster* Thomson 1868, none of which have been recognised in Australia, may also be synonyms.

Genus *Syrphus* Fabricius.

Six species belonging to this genus and commonly met with in collections, may be distinguished by the following key:—

KEY TO SPECIES OF GENUS *SYRPHUS*.

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| 1. Face entirely yellow; abdomen with broad yellow bands, that on the second segment being interrupted | 2 |
| Face not entirely yellow | 5 |

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| 2. Abdomen very broad and flat, the lateral margins being marked off by a depression | <i>confrater</i> Wied. | |
| Abdomen less broad and the lateral margins not marked off by a depression | | 3 |
| 3. Third abdominal segment with a narrow discal black band .. | | 4 |
| Third abdominal segment with bands only along the segmentations, none on the discal area | <i>sellenyi</i> Sch. | |
| 4. Fourth abdominal segment with a discal band | <i>balteatus</i> Deg. | |
| Fourth abdominal segment without a discal band | <i>sp.</i> | |
| 5. Face yellow with the tubercle and oral margins black. All yellow bands of the abdomen interrupted | <i>viridiceps</i> Macq. | |
| Face entirely black, at most with a grey pulverulent covering over part of the area | | 6 |
| 6. Abdomen black with narrow light bands | <i>serarius</i> Wied. | |
| Abdomen black with interrupted light bands that appear as semilunar spots | <i>ortas</i> Walk | |

Syrphus confrater Wiedemann 1830, is recorded from Asia to New Guinea and is also a well known Australian species.

Syrphus sellenysi Schiner 1868, has a slender abdomen with simple black bands somewhat like those of the prior species. Two males from Brisbane are before me.

Musca balteatus Degeer 1776, is the name usually applied to a form recorded from Australia by Macquart as *Syrphus alternans* Macquart 1842, from India. Brunetti elucidated the position for India for that variable form, but in Australia the species which goes under this name varies very little. I do not know if the species in Australia is truly *S. balteatus*; the matter requires investigation.

Syrphus sp. I have no name for this form which is somewhat like *S. balteatus* in markings, but has the face covered by a light pulverulent overlay; the abdominal bands especially on the apical segments are much wider.

Syrphus viridiceps Macquart 1847, has the central area of the face black and the scutellum may be largely black, whilst the bands of the abdomen may be broken up into six large yellow spots with traces of another pair at the apex. This very common species may have been described under two other names, *S. collatus* Walker, 1852, and *S. jacksoni* Bigot 1884.

Syrphus ortas Walker 1849, was originally described from New Zealand, and this species would seem to be identical with a common Tasmanian form that is very dark; the yellow bands of the abdomen being often obscure, each being interrupted and reduced to two semilunate spots; also these spots may be covered with an overlay that shines yellow or grey in accordance with the incidence of the light reflected. *Syrphus ambusta* Walker 1852, may belong here.

Syrphus serarius Wiedemann 1830, is a name applied by Ferguson to a black species with three linear pulverulent covered bands that traverse the abdomen. The form is apparently not previously recorded from Australia but is to be met with in Brisbane and perhaps more frequently in scrub areas.

Two species placed here have not been recognised. *Syrphus rufiventris* Macquart 1849, and *Scaeva damastor* Walker 1849. It is not yet possible to suggest their generic position.

Genus *Asarkina* Macquart.

Two species are known to me in this genus, but Ferguson has labelled specimens with two other names attributing them to Bezzi.

As I have failed to trace these in literature, I suspect them of being manuscript names and so omit them here.

Eristalis aegrota Fabricius 1805, has a black area across the central part of the wing, occupying about a third of the length.

Syrphus ericetorum Fabricius 1781, has hyaline wings. Both of these species are common in the northern parts of Queensland and the former reaches Brisbane; some years being rather plentiful at Sunnybank.

Genus *Triglyphus* Loew.

Triglyphus fulvicornis Bigot 1884, is known from Stanthorpe in Queensland, to Tasmania.

Genus *Baccha* Fabricius.

This well known genus is well represented in Australia, several species being bred from aphides. Two species are described, *B monobia* Terry, and *B. siphanticida* Terry 1905; both are from north Queensland. Ferguson does not seem to have identified either.

Genus *Cyphipelta* Bigot.

Brachyopa rufocyanea Walker 1835, a species to which the names *Eristalis vesicularis* Erichson 1842, and *Cyphipelta conifrons* Bitgo 1859, also apply. It is not common but Mr. F. A. Perkins took a series at Stanthorpe, and I have one from Brisbane (August 1920). It is also known from Sydney and Bigot's record from Tasmania needs confirmation.

Genus *Chrysogaster* Meig.

There are several groups that are placed under the generic name *Chrysogaster* and it seems advisable to incorporate *Hemilampra australis* Macquart 1849, in this position, as it is probably congeneric with the other forms already placed here. *Chrysogaster cuproeus* Macquart 1849, and *C. australis* Macquart 1854, are not recognised. *Chrysogaster rectinervis* deMeijere 1908, and *C. rufonasus* Curran & Bryan 1926, are not certainly recognised as there seems to be a series of species which comes near each of them.

Genus *Chilosia* Meigen.

Chilosia australis Macquart is a common Brisbane species having rather dissimilar sexes. I have not seen any illustration that has such a small area forming the eye-margins, on which character it might be excluded from the genus, but on the other hand all the other characters seem to indicate its alliance with the genus *Chilosia* in which position it is retained.

Genus *Psilota* Meigen.

Numerously represented in Australia, but poorly so in other parts of the world; this genus has had no defined limits. Quite a number of subsidiary groups could be made out of it but it would appear that only two are at present worthy of recognition, the typical group having the posterior femora without the flange, the other with it. The genus *Emmyia* Klocker 1924, is but little different from the typical form, *P. anthracina* of Europe and hence it is regarded as being congeneric. Two species have not been recognised in Australian collections, but enough is given in their descriptions to indicate their probable position and hence are incorporated in the key.

KEY TO SPECIES OF *PSILOTA*.

1. Hind femora, on the posterior side, indented and with a ventral flange just before the apex 6
- Hind femora simple and without a flange 2
2. Entirely black and blue-black species (hairs excepted) .. 3
- Species with the abdomen red or mainly so *rubra* Klock
3. With a golden-red pile over the apical portion of the abdomen *auricaudata* C. & B. 4
- Without such pile 4
4. Crossvein at apex of wing practically straight 5
- Crossvein at apex of wing conspicuously bent. Large species with the crossvein sinuous *queenslandica* Klock
5. Abdomen hairy *hirta* Klock.
- Abdomen practically bare *tristis* Klock.

KEY TO SPECIES OF *PARAPSILOTA*.

6. Dark blue-black and steel-blue species 7
- Vivid blue-green species 8
7. Abdomen blue-black *femoralis* Schin.
- Abdomen reddish (? discoloured) *erethrogaster* C. & B.
8. Hair on face bright yellow and longer than usual *coerulea* Macq. 9
- Hair on face whitish 9
9. In profile the line of the face from antennae to oral margin is approximately the same in both sexes, the oral protuberance being of equal prominence *viridis* Macq.
- Face dissimilar in the sexes, the female having the oral margin more protruding and the face apparently concave *victoria* Curran

Subgenus *Psilota*.

Psilota rubra Klocker 1924, has the abdomen genuinely red, and not discoloured as sometimes happens with species that are normally black. The flies belonging to this series (for there seem to be several) fly along logs in company with a bee which also has a red abdomen I have seen this in Queensland and Tasmania. The male is not known

Psilota auricaudata Curran & Bryan 1926, is commonly found flying around dead upstanding trees, but the male has not yet been discovered.

Psilota tristis Klocker, is also only known from the female, but there is a species very closely allied in which both sexes are before me. This second form is more strongly metallic, having a green thorax and violet abdomen instead of blue-black and black respectively.

Psilota queenslandica Klocker, the typical form of genus *Emmyia*, is only known from the male, several being in various collections. Klocker's figure is very faulty, judging from the specimen he identified under the name and which fits the description exactly.

Psilota hirta Klocker, is perhaps the commonest species in Brisbane, the male being specially noticeable, sometimes hovering around trees in countless numbers. There is only one female before me, and some specimens from Tasmania seem to be conspecific though larger in size.

Subgenus *Parapsilota* n. subg.

Psilota victoria Curran 1925, was a name given to replace *Psilota cyanea* Hill (nec. Brunetti 1921). The specimens identified by Curran under the name, however, probably belong to another species, perhaps *P. viridis* Macquart. Hill's figures are very accurate, but he gave the lateral view of only the female head.

Psilota viridis Macquart 1847, is evidently the common Victorian species which I have selected to be the type of the subgenus.

Psilota coerulea Macquart 1846, is another form that seems easily identified but less common.

Psilota femoralis Schiner 1868, undoubtedly comes into this position as the author mentions the femoral character, but *Psilota erethrogaster* C. & B. does not have the character mentioned, nevertheless it would seem to belong here.

All of the above species under *Parapsilota* and others, have in common an indentation on the posterior side of the hind femora, below which is a ventral flange situated just before the apex. The character is very consistent and no apparent grades exist between this and the simple femora of species placed under the subgenus *Psilota*. In addition to this it seems strikingly obvious that all the forms that deviate away from the typical form to any extent, belong to this subgenus, but all the characters yet studied seem to show gradations in *Parapsilota* to that of *Psilota*. There are some very apparent smaller divisions existing under both subgenera but material does not permit me to make the necessary groups to illustrate this. Most of the species have yet to be described and presumably many more are to be found. *Psilota* and its allies occur during the spring and in Brisbane at least their occurrence is irregular, some years they occur in abundance and in others are very difficult to find.

SPECIES NOT RELEGATED TO A GENERIC POSITION.

Plesia analis Macquart 1849, and *Melanostoma apicale* Bigot 1884 (Klocker in 1924, identified it under the latter name), refer to the male of a very abundant species. The female, however, has a concave face without a knob and does not conform to genus *Melanostoma*. The characters bring this species in the key given above to *Chilosia* but it does not belong there and it is not congeneric with *C. australis*, nor is it related to the *Chrysogaster* group. There is another but smaller species that is congeneric with this one and is found on tea-tree (*Melaleuca*) and on marshes in association with it. The two species are liable to be confused.

LIST OF WORKS.

The following list contains those works which record species of Syrphinae from Australia and the original descriptions of such species; the list being limited to those of taxonomic value. In economic literature there are many references, the species not always being identified, or sometimes faultily so.

AUSTEN.	..	..	Proc. Zool. Soc. Lond. i. 1893, 163.
BIGOT.	..	..	Rev. Mag. Zool. ii. 1859, 307.
			Bull. Soc. Ent. France, 1882, lxxviii.
			Ann. Soc. Ent. France (6) iv. 1884.
BRUNETTI.	..	..	Faun. Brit. Ind. iii. 1923.
CURRAN. Amer.	..	..	Mus. Novitates, No. 176, 1925, 7.
			(In same periodical No. 200, is <i>Cerioides victoria</i> , a description overlooked by Ferguson).
CURRAN & BRYAN.	..	..	Proc. Lin. Soc. N.S. Wales, li. 1926, 129-133.
DEGEER.	..	..	Mem. pour serv. l'Hist. d. Ins. vi. 1776.
de MEIJERE.	..	..	Tidj. v. Ent. li. 1908, 191-332.
ERISCHSON.	..	..	Arch. f. Naturg. viii. 1842.
FABRICIUS.	..	..	Spec. Ins. 1781.
	..	..	Syst. Ant. 1805.
FALLEN.	..	..	Dipt. Sueciae, 1817.
FERGUSON.	Proc. Lin. Soc. N.S. Wales, li. 1926, 137-183, 515-544.
			(Partial revision of the Syrphidae).

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| GRIMSHAW. | .. | .. | Fauna Hawaiensis iii. 1901. |
| HILL. | .. | .. | Proc. Lin. Soc. N.S. Wales, xlvii. 1921, 216-220. |
| KLOCKER. | .. | .. | Mem. Queensland Mus. viii. 1924, 53-60. |
| LINNAEUS. | .. | .. | Syst. Nat. Ed. x. 1758. |
| MACQUART | .. | .. | Dipt. Exot. 1838-55. |
| RODER. | .. | .. | Wien Ent. Zeit. i. 1882, 61-2. |
| SCHINER. | .. | .. | Reise Novara Dipt. 1868. |
| SHIRAKI. | .. | .. | Mem. Fac. Sci. Agr. Taikoku Univ. Formosa. 1930. |
| TERRY. | .. | .. | Bull. Exp. Stat. Hawaii, i. 1905, 177-9. |
| THOMSON. | .. | .. | Eugenies Resa 1868, 501. |
| WALKER | .. | .. | Ent. Mag. ii. 1835, 472. |
| | | | List Dipt. B.Mus. iii. 1849. |
| | | | Ins. Saund. Dipt. i. 1852. |
| WIEDEMANN | .. | .. | Dipt. Exot. 1824. |
| | | | Auss. Zweifl. Ins. 1830. |